	Application No.	Applicant(s)
Notice of Allowability	10/821,380	CYPHER, ROBERT E.
	Examiner	Art Unit	
	Shane M. Thomas	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *Application filed 4/9/2004*.

2. ☒ The allowed claim(s) is/are *1-17*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some*   c) ☐ None of the:

       1. ☐ Certified copies of the priority documents have been received.

       2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

       3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application. **THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

       1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 2/10/2005

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)

6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or

additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR

1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the

payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with

Steve Curran (Reg. No. 50,664) on 5/15/2006.

The following claims have been amended as follows:

5.   The mechanism as recited in claim 1, wherein in response to a predetermined

number of said plurality of entries of said first storage and said second storage becoming

populated with said first and second sets of said corresponding snoop filter indications,

respectively, said cache controller is further configured to disable filtering snoops by

generating a snoop operation for said transaction request independent of said

corresponding snoop filter indication stored in each of said first storage and said second

storage.

7.   The mechanism as recited in claim 6, wherein during said repopulation process,

said cache controller is further configured to initialize each of said plurality of entries of

said storage to an initialization value.

13.   The method as recited in claim 9 further comprising disabling filtering snoops by generating a snoop operation for said transaction request independent of said corresponding snoop filter indication stored in each of said first storage and said second storage in response to a predetermined number of said plurality of entries of said first storage and said second storage becoming populated with said first and second sets of said corresponding snoop filter indications, respectively.

15.   The method as recited in claim 14 further comprising initializing each of said plurality of entries of said storage to an initialization value during said repopulation process.

Priority

The priority claim to provisional application 60/520619, filed 11/17/2003 under §119(e)

has been acknowledged.

Reasons for Allowance

Claims 1-17 are allowable over the prior art of record.

The following is an examiner's statement of reasons for allowance:

As per claims 1,9, and 17, the prior are of record does not teach, either alone or in

combination, all of the limitations of the claims. Specifically, the prior art of record does not

teach using two hash functions on an incoming address to produce two output index values,

accessing corresponding storages each at the respectively output index value, and selectively

issuing a snoop operation based on the corresponding snoop filter indications stored at both of

the respective indexes of the storages.

Further regarding claims 1,9, and 17, the Examiner also weighed the present claims

against the claims comprised in application 10/821,430 with regard to double patenting issues;

however, the current claims exhibit the patentable distinctness of considering two entries of two

different snoop filter memories, each indexed by a separate hash function, when considering

whether or not to issue a snoop operation to the cache memory. Such a limitation would not

have been obvious to one having ordinary skill in the art given claims 1-32 of application

10/821,430. Although scope of claims 6 and 22 incorporate utilizing a second memory index via

a hash function, the present application does not claim a first and second mode of operation of

the cache controller.

Any comments considered necessary by applicant must be submitted no later than the

payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for

Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

Chiou et al. (U.S. Patent No. 6,370,622) teaches using a lower-level cache Ca2 (figure 3)

as a snoop filter to only propagate transactions involving cache lines that are in the higher-level

cache (Ca1) - column 4, line 43-61.

Richard et al. (U.S. Patent Application Publication No. 2003/0093630) teaches executing

a snoop operation when an incoming hashed address collides with an existing tag entry whose

existing state is owned - ¶45.

Coulson (U.S. Patent No. 6,725,342) teaches using a hashing algorithm when accessing a

cache directory (i.e. snoop filter) and issuing a snoop operation if the directory indicates that

requested data is stored in the cache, but does not specifically teach using two such directories

and executing a snoop operation if both directories indicate that the requested data is stored in

the cache - column 6, lines 32-53.

Dieffenderfer et al. (U.S. Patent Application Publication No. 2004/0186964) teaches a

snoop filter capable of parsing (not hashing) a snoop request and determining whether the data

might be in a cache (abstract).

Safranek et al. (U.S. Patent Application Publication No. 2004/0003184) teaches a

allocating snoop filter entries in response to initial accesses of a local cache by a remote cache

(abstract).

Anderson et al. (U.S. Patent Application Publication No. 2003/0177317) teaches a

replacement scheme for snoop filter entries.

Phelps (U.S. Patent No. 5,966,729) teaches only broadcasting an address request to

processors likely to contain the requested data via use of a snoop filter (abstract).

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Shane M Thomas whose telephone number is (571) 272-4188.

The examiner can normally be reached M-F 8:30 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Matt M Kim can be reached at (571) 272-4182. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shane M. Thomas

MATTHEW KIM
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